

What is Claimed is:

1. A honeycomb structure comprising:

a plurality of through channels separated by porous partition walls and extending in an axial direction of the  
5 honeycomb structure;

wherein all of said through channels have plugging portions, respectively that plug alternately at either one end of the honeycomb structure or its opposite end in a checkered flag pattern, and

10 wherein at least one slit per through channel is formed in the vicinity of the plugging portion of the partition walls surrounding the respective through channels.

2. The honeycomb structure according to claim 1,

15 wherein said at least one slit is linearly formed in an axial direction to which the through channels extend.

3. The honeycomb structure according to claim 1,

wherein a width of slit is in a range of 0.2 to 1 mm, and a  
20 length of the slit is 1 mm or more but is not longer than a length which is shorter between 30 mm and 1/2 of a length of the honeycomb structure.

4. The honeycomb structure according to claim 1,

25 wherein a width of the slit is in a range of 0.4 to 0.8 mm, and a length of the slit is 2 mm or more but is not longer than length which is shorter between 15mm and 1/4 of a length

of the honeycomb structure.

5. The honeycomb structure according to claim 1,  
wherein the number of slits per through channel in the  
5 vicinity of an outer peripheral portion is larger than that  
located in a central portion from a peripheral side of the  
honeycomb structure.

10 6. The honeycomb structure according to claim 1,  
wherein the length of the slit in the vicinity of the outer  
peripheral portion is longer than that located in a central  
portion from a peripheral side of the honeycomb structure.

15 7. The honeycomb structure according to claim 1,  
wherein the width of the slit in the vicinity of the outer  
peripheral portion is wider than that located in a central  
portion from a peripheral side of the honeycomb structure.

20 8. The honeycomb structure according to claim 1,  
wherein the width of the slits varies from slit to slit.

25 9. The honeycomb structure according to claim 1,  
wherein an oxide catalyst is carried on at least in the  
vicinity of the slits.

10. The honeycomb structure according to claim 1,  
whose partition walls have filterability and which is used as

a filter for trapping/collecting/ removing particulate materials included in a dust-containing fluid such as exhaust gas of an internal combustion engine.

5           11. The honeycomb structure according to claim 1, wherein a sectional shape of the through channel is triangular, quadrangular, hexagonal, or circular.

10          12. The honeycomb structure according to claim 1, wherein a major crystal phase of the honeycomb structure is made of either one of cordierite, silicon carbide, silicon nitride, alumina, mullite, or LAS.

15          13. A method for manufacturing a honeycomb structure comprising a plurality of through channels separated by porous partition walls and extending in an axial direction of the honeycomb structure; wherein all of said through channels have plugging portions, respectively that plug alternately at either one end of the honeycomb structure or its opposite end in a checkered flag pattern, and wherein at least one slit per through channel is formed in the vicinity of the plugging portion of the partition walls surrounding the respective through channels, which method comprises the step of:

25          jetting a fluid onto a honeycomb structure to form at least one slit per through channel in the vicinity of the plugging portions of the partition walls before or after

firing a green honeycomb structure.

14. The method according to claim 13, wherein the fluid is either one of compressed air, water vapor, or water.

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15. A method for manufacturing a honeycomb structure comprising a plurality of through channels separated by porous partition walls and extending in an axial direction of the honeycomb structure; wherein all of said 10 through channels have plugging portions, respectively that plug alternately at either one end of the honeycomb structure or its opposite end in a checkered flag pattern, and wherein at least one slit per through channel is formed in the vicinity of the plugging portion of the partition walls 15 surrounding the respective through channels, which method comprises the step of:

irradiating a honeycomb structure with a laser beam to form at least one slit per through channel in the vicinity of the plugging portions of the partition walls.

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16. An exhaust gas purification system for trapping/collecting/removing particulate materials containing carbon as a major component in a dust-containing fluid such as exhaust gas of an internal combustion engine, the system 25 comprising:

a honeycomb structure comprising a plurality of through channels separated by porous partition walls and

extending in an axial direction of the honeycomb structure; wherein all of said through channels have plugging portions, respectively that plug alternately at either one end of the honeycomb structure or its opposite end in a checkered flag pattern, and wherein at least one slit per through channel is formed in the vicinity of the plugging portion of the partition walls surrounding the respective through channels, for use as a filter for trapping/collecting the particulate materials; and

10 heating means for burning the particulate materials trapped/collected by the honeycomb structure to regenerate a filterability.

wherein said at least one slit per through channel of the honeycomb structure are closed by deposition of the 15 trapped/collected particulate materials, the slits having been closed are open by burning the particulate materials deposited with a heat at time of regeneration treatment thereof, and at least some of non-burnable materials such as ashes deposited in the honeycomb structure are discharged 20 from the honeycomb structure by a flow of the dust-containing fluid at a time when slits are reopened.

17. The exhaust gas purification system according to claim 16, wherein the heating means is either one of an 25 electric heater, a burner using a gas or liquid fuel, a microwave generation apparatus, or heating means for rising an exhaust gas temperature with burning discharged non-burnt

fuel components in the exhaust gas of an internal combustion engine with an aid of a catalyst reaction.